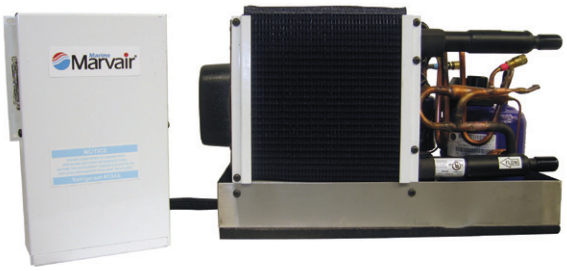
Self-contained DC Air Conditioners 12 & 24 VDC

Models SMB05ACP (12 VDC) and SMD14ACR (24VDC)

Owner's & Installation Manual



SMB05ACP

SMD14ACR

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DC Air Conditioners

Chapter 1 – Safety Considerations

Congratulations on your purchase of a marine air conditioner by Marvair®. Your air conditioner has been designed to provide years of safe, dependable operation. These instructions contain a general description on the operation of the unit, how to set up thermostat, a list of routine maintenance items, basic trouble shooting information, and the warranty. Installation of the air conditioner is also discussed.
The first thing we recommend for you to do is to write down the model and serial number of the unit. The number can be found on the data label on the unit. Refer to them whenever you call upon your Marvair Marine dealer regarding this unit.

Model No. _____ Serial Number_____

Safety Considerations

This is the safety alert symbol ⚠. When you see this symbol on the Marvair Marine unit and in the instruction manuals be alert to the potential for personal injury. Understand the signal word DANGER, WARNING and CAUTION. These words are used to identify levels of the seriousness of the hazard.

⚠ **DANGER**	Failure to comply will result in death or severe personal injury and/or property damage.
⚠ **WARNING**	Failure to comply could result in death or severe personal injury and/or property damage.
⚠ **CAUTION**	Failure to comply could result in minor personal injury and/or property damage.

IMPORTANT is used to point out helpful suggestions that will result in improved installation, reliability or operation.

⚠ DANGER

Self-contained units or evaporators of split systems should never be installed in engine rooms or other areas where fuel, battery or bilge vapors may be introduced to the living quarters on board.

These components do not meet federal requirements for ignition protection. Do not install in spaces containing gasoline engines, tanks, LPG/CPG cylinders, valves, fuel line fittings, or regulators. Failure to comply may result in injury or death.

Do not terminate condensate drain line within four feet of any outlet of engine or generator exhaust systems, nor in a compartment housing an engine or generator.

Installation and servicing of this system can be hazardous due to system pressure and electrical components. When working on this equipment, always observe precautions described in the literature, tags and labels attached to the unit(s). Follow all safety codes.

Marvair recommends that you use only factory certified, EPA licensed refrigerant technicians and qualified marine electricians. ABYC certification in both HVAC and Marine electrical trades is desirable. In receiving these certifications, a technician and his employer has made a statement of commitment to professional, technically proficient and reliable service.

⚠ CAUTION

Certain components will run at fairly high temperatures. Exercise care in working around operating equipment. Do not touch operating machinery without the aid of qualified personnel, as referred to above.

Air Flow

Proper air flow is critical to the operation of the air conditioner. All grilles, both supply and return, must never be blocked by objects such as bed linens, duffel bags, tackle boxes, etc.

Return Air Grille(s) and Filter(s)

Return air grilles are available in both aluminum and wood in standard configurations. They do not have adjustable louvers and are available with and without filters. Return air filters should be cleaned regularly. The filter shipped with your unit is located in front of the air coil can be cleaned with a vacuum cleaner or rinsed with fresh water.

If your unit's return air grille has a filter, be sure that your boat builder or installation technician has removed the standard filter that comes with every unit in front of the evaporator (air) coil. Two filters can unduly restrict air flow and in some cases, cause problems with performance. Use EITHER a return air filter grille or the supplied filter, never both.

Depending upon the floor plan, your boat's space constraints may dictate that a unit be installed in an area that makes it difficult to access and clean the filter. If this is the case, and you do not have a return air filter grille, you should consider removing the disposable unit filter and upgrading to a return air filter grille.

NOTE: Blocking the return air grille of neglecting filter cleaning will result in a restriction of air flow. After a period of time, ice will form on the evaporator coil and a resultant LOW PRESSURE FAULT shutdown.

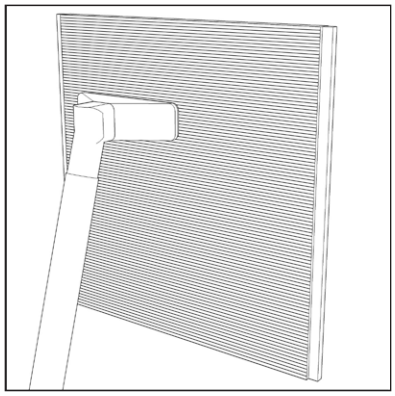


Figure 1. Filter can be cleaned with a vacuum cleaner.

Supply Air Grille(s)

Some installations will have more than one supply air grille. Standard main supply air grilles are generally made of aluminum or wood frames with two or four-way adjustable louvers. These may be adjusted to direct air flow from the grille to ensure a uniform cabin temperature. Main supply air grilles should never be closed at any time while the unit is running. The secondary supply air grille more frequently will be a 4" (102mm) round plastic design, but they can also be of the aluminum or wood frame standard configuration and are usually located out of the main salon, galley, dinette area. These may, depending upon the style you or your boat manufacturer has chosen, be closable. During the day, it may be closed should you like more air directed to the main living area. Consult with your local Marvair Marine service representative if you are unsure which is the main supply grille on your boat. Closing off the main supply air grille or secondary air grille, in some applications, may restrict air flow and cause ice up of the evaporator.

Condensate Pan and Lines

The condensate and lines can develop an algae type growth. Periodic inspection and treatment with a mild solution of bleach and water poured into the condensate pan will keep the condensate pan and lines clear.

Sea Water Strainer

The seawater strainer is available in several configurations – bronze or plastic. Yours has been sized in accordance to system specifications for volume of water required. It is used to prevent debris such as eelgrass, sea weed, leaves, etc., from passing through the system water lines and condensing coil. These items could lodge themselves in the water supply causing several possible shutdown faults, and left unchecked, equipment damage. Should the strainer become clogged or partially obstructed, adverse performance will be experienced. The first indication will be a reduction in the quantity of the discharge water. Eventually , the high pressure switch in the unit will activate and shut the unit down. (See Troubleshooting.) Turn the power off to the unit; check strainer and pump, restart. (See Pump and Troubleshooting.)

To eliminate these potential problems, it is recommended that you check to make sure you have water flow each time you turn the system on and clean your strainer weekly. More often as conditions dictate. In some regions, it is common to experience a tremendous presence of jellyfish or sea nettles concentrated in back bay marinas for short periods of time. These can clog strainers and water pumps every hour to hour and a half in some cases. In such severe conditions, seek the advice of your local factory service representative. They will be most familiar with solutions to localized situations. Marvair works closely with our servicing dealers when custom solutions are required. During the warranty period, factory approval must be obtained for any modification to be done to alleviate the problem without voiding warranty coverage.

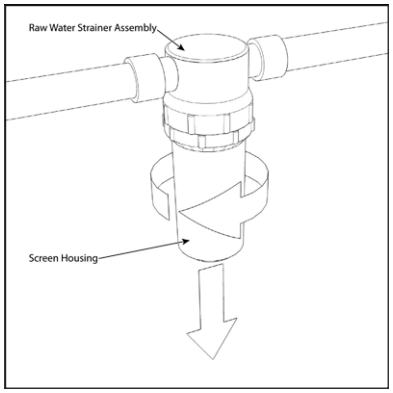


Figure 2a. Unscrew and remove Screen Housing

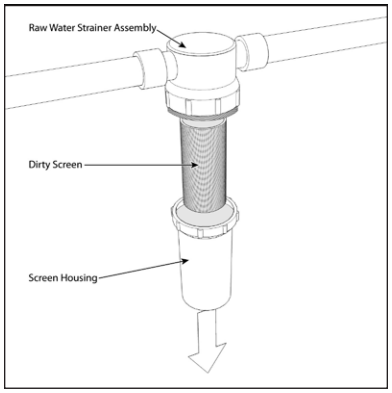


Figure 2b. Remove dirty Screen

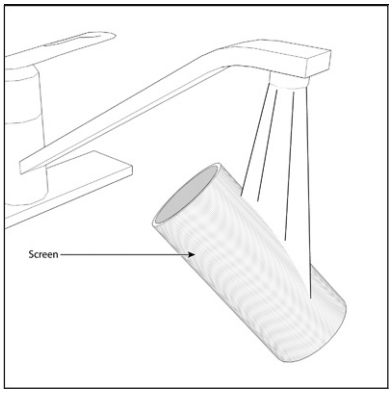


Figure 2c. Rinse Screen with clean water. Reinstallation is the reverse of removal

Sea Water Pump

Your seawater pump has been sized in accordance with specifications for system water flow and volume. A minimum flow rate of 1.5 GPM (5.69 LPM) for the SMB05 and 3.0 GPM (11.4 LPM) for the SMD14 is required for proper operation. Always measure the flow rate at the inlet to the air conditioner. The pump is a self priming.

Occasionally, sea grass, jellyfish and other items may pass through your strainer and get lodged in the pump impeller. Should cleaning your strainer fail to eliminate a water flow problem, you should next check the pump. First loosen the discharge line and gently remove it from the pump assembly. (Make sure the seacock is open.) Water should rise above the pump to a level equal to the waterline of your boat. If not, there is a blockage.

Thermostat

A wall mounted thermostat/controller controls the operation of the Marvair air conditioner. The air temperature sensor is located in the thermostat. Therefore, the thermostat should be placed to accurately measure the temperature of the air in the room. Do not place the thermostat in direct sunlight. Make sure that the cool air produced by the unit does not blow directly onto the thermostat.

Complete instructions for operating and configuring your thermostat can be found in Chapter 5.

Chapter 3 – General Description

The DC air conditioners built by Marvair® are self-contained, water-cooled units designed for use with either fresh or seawater. They are designed to be used with a wall mounted thermostat and use R-134a refrigerant.

Operating Ranges

The air conditioner is designed to work over a wide range of conditions. Among the most important factors that affect the performance of the unit are inlet water temperature, inlet (return) air temperature and the humidity of the inlet (return) air. Please consult your Marvair Marine dealer or the factory if you have a question about the operation of your air conditioner.

Electrical

The SMB model is designed to operate of a nominal 12 volt DC power supply - an inverter is not required. The unit will operate on a DC voltage from 9 volts to 17 volts. The SMD14 is designed to operate on a nominal voltage of 24 volt DC power supply. The SMD14 will operate on DC voltage from 21 to 28 volts.

General Operation

The air conditioners use R-134a refrigerant in a conventional vapor compression cycle to transfer heat from the air in the boat to the water. In the cooling mode, a blower blows the cabin air through the indoor or evaporator coil where it is cooled and dehumidified. Liquid refrigerant passing through the evaporator is boiled into a gas by heat removed from the air. The warmed refrigerant gas enters the compressor where its temperature and pressure are increased. The hot refrigerant gas travels to the water coil or condenser where it is cooled by the water and condenses to a liquid. Liquid refrigerant is metered back into the evaporator coil to repeat the process.

High Pressure Switch

Located on the liquid refrigerant line, it is electrically connected to a lock-out relay which shuts the unit off if the refrigerant pressure rises above the pressure set point (250 psig). This protects the air conditioner if water flow is restricted.

The contacts on the high pressure switch close when the refrigerant pressure falls below the pressure set point (150 psig). See Section, “Fail Safe & Fault Handling Modes’ in the thermostat/controller section for the o-LED and o-Touch thermostats.

	Opens	Closes
High Pressure	250	150

Figure 3. High Pressure Switch Settings

Compressor Time Delay

Prevents compressor from short cycling by delaying the compressor from starting whenever power is initially applied to the air conditioner or whenever there is a call for cooling. The delay is 10-12 seconds after the fan turns on.

Chapter 4 – Installation Instructions

Equipment Inspection

Concealed Damage

Inspect all cartons and packages upon receipt for damage during transit. Remove shipping cartons and boxes and check for concealed damage. Important: Keep unit upright at all times.

Inspect refrigerant circuit for fractures or breaks. The presence of refrigerant oil usually indicates a rupture in the refrigerant circuit.

Units that have been turned on their sides or upside down may have concealed damage to the compressor, other components or to the refrigerant system. If the unit is not upright when you receive it, immediately file a claim with the freight carrier for concealed damage and follow these steps:

1. Set unit upright and allow to stand for 24 hours with primary power turned OFF.
2. After 24 hours, connect power to unit.
3. Attempt to start the unit after 24 hours.
4. If the unit will not start or makes excessive noise, return the unit to the freight carrier.

Installation Requirements

⚠ WARNING

If the information in these instructions is not followed exactly, a fire, carbon monoxide poisoning or explosion may result causing property damage, personal injury or loss of life • Read all instructions carefully prior to beginning the installation. Do not begin installation if you do not understand any of the instructions. • Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. • Installation and service must be performed by a qualified installer, service agency in accordance with these instructions and in compliance with all codes and requirements of authorities having jurisdiction.

Location Requirements

- Marvair self-contained air conditioners do NOT meet Federal requirements for ignition protection. NEVER install the Marvair® air conditioner in an engine room, the bilge or any areas where it may introduce deadly or noxious vapors into the boat's living space. NEVER install the unit in any room or compartment that contains an internal combustion engine, fuel tanks, LPG/CPG cylinders, regulators, valves or fuel line fittings.
- The condensate drain line MUST NOT terminate within three (3) feet of the exhaust of any engine or generator nor any room that contains an engine or generator. Under some circumstances, carbon monoxide can be pulled through the condensate tubing and introduced into the conditioned air.
- It is recommended not to install the air conditioner above an electronic or electrical panel, circuit breakers or anything electrical. If installed in this or an overhead location, a secondary drain pan should be used.
- Select a location for noise considerations. Putting the unit under a bunk may not be desirable for sound reasons. A better location may be at the bottom of a hanging locker. In some installations, acoustic baffles may be required.

- The unit must be installed in a space with sufficient clearance on all sides for proper air circulation and for services. A minimum of three (3) inches must be provided from the face of the air coil to any obstruction, wall or bulkhead. Sufficient air flow is critical to the proper operation of the unit.
- Before placing the unit(s) into the space, make certain that there is sufficient room for all duct work, condensate line connections, water in and out, electrical power connections and control power connections.
- The unit must be installed on level surface on a minimum of ½" plywood or equivalent. The condensate line must, at all times, be lower than the base pan.
- For optimum air circulation, it is good practice to install the supply air grilles near the top of the cabin and the return air grille near the floor. This normally provides good circulation of the conditioned air throughout the cabin. The location should provide easy access to the filter. If the filter is not readily accessible, it probably will not be changed, shortening the life of the unit and operating at less than designed performance.
- To save space & facilitate installation, the Marvair air conditioner has a detachable electrical box. The box can be mounted on the unit's water connection side, the return air side, above the compressor or remote from the unit.

Electrical Requirements

⚠ WARNING

Failure to follow safety warnings exactly could result in serious injury, death, and/or property damage.

Turn off electrical power at fuse box or service panel BEFORE making any electrical connections and ensure a proper ground connection is made before connecting line voltage

All electrical work must meet the requirements of all applicable codes and ordinances. Work should only be done by qualified persons.

If the wiring diagram that is on or was shipped with the unit is different from the one in this manual, refer to and use the wiring diagram that is on or was shipped with the unit.

1. DC Wiring (12V or 24V) The power supply must have the proper voltage for the selected model.
   a. Refer to the data label on the unit for field wiring requirements. The electrical data lists fuse and wire sizes for the unit.
   b. Each unit has a Minimum Circuit Ampacity (MCA). Field wiring must be used that is of sufficient size to carry that amount of current. Use copper conductors only. Refer to the National Electrical Code for complete current carrying capacity data on the various insulation grades of wiring materials.
   c. Power supply must be within allowable range of ±10% of rated voltage.
   d. The unit must be properly grounded to reduce the risk of shock or electrocution.
   e. A properly sized circuit breaker must be used. Information required to size the breaker is on the unit. The water pump does not require a separate breaker if there is only one air conditioner. However, the breaker must be sized for both the water pump and the Marvair unit. A separate breaker is required for the water pump if multiple Marvair units are installed.
   f. Connections between the ship's alternating current grounding conductor and the ship's negative or bonding system must be made as part of the ship's wiring as per ABYC standard E-11 or equivalent.
   g. When servicing or replacing existing equipment that contains a chassis mounted ground lug, the service person or installed must verify the ship's wiring for the connection required in item f. above.
   h. All electrical connections must be made within the electrical junction boxes supplied with the unit. A terminal strip and/or electrical connectors are provided for component installation.

The tables below show the correct wire size to use with the SMD05 and the SMD14 air conditioners based upon the one way wire length from the air conditioner to the breaker. The out and back is included in the wire size. Do not use a wire size less that those shown below. Using a smaller wire size can cause the wire to overheat and burn.

SMB05ACP Wire Size @ Various Distances					
One way distance ft (cm)	1'-6' (1-183 cm)	6'1" - 11' (184 - 335cm)	11'1-18' (336-549 cm)	18'1"-28' (550-853 cm)	28'1"- 45' (854 - 1,372 cm)
Wire Size	#10	#8	#6	#4	#2

SMD14ACP Wire Size @ Various Distances					
One way distance ft (cm)	1' - 17' (1-518 cm)	17'1" - 26' (519 - 792 cm)	26'1 - 43' (793 - 1,311 cm)	43'1"- 67' (1,312 - 2,042 cm)	67'1"- 108' (2,043 - 3,292 cm)
Wire size	#8	#6	#4	#2	#1/0

Figure 4. Recommended Wire Size

Bonding

To prevent corrosion due to stray electrical current or voltage, all metallic parts in contact with water must be connected to the ship's bonding system. This includes the air conditioner, all pumps, metallic valves, fittings, strainers and thru-hulls. If any of these parts are isolated by PVC, vinyl, or rubber hoses, they must be individually bonded to the ship's bonding system. Failure to properly ground and bond the system may void the warranty.

Mounting of the Air Conditioner

Select a surface that is firm and level, with sufficient clearances. Mount the unit on a minimum of ½" plywood or equivalent. The unit will be secured to the surface with four hold down brackets. Secure the bracket with suitable fasteners; e.g., lag screws. Note: To facilitate installation, the hold down fasteners may be installed after all duct, water, condensate, and electrical connections are made.

Condensate Drains

⚠ WARNING CARBON MONOXIDE POISONING HAZARD

Failure to follow safety warnings could result in serious injury, death, or property damage.
The condensate drain line MUST NOT terminate within three (3) feet of the exhaust of any engine or generator nor any room that contains an engine or generator. Under some circumstances, carbon monoxide can be pulled through the condensate tubing and introduced into the conditioned air.

The stainless steel base pan has multiple openings for condensate drains. It is highly recommended that two of the openings be utilized – one for back-up in case the other one becomes clogged or blocked. The other openings should be sealed and plugged. The air conditioner can produce significant quantities of condensate that may cause extensive damage to the vessel if not disposed of properly.

A. Select the two openings that will NOT be used for condensate lines.
B. Plug and seal them.
C. Install the condensate drain fittings through the base pan. Make sure the fitting is water tight.
D. Attach a 5/8" ID reinforced hose to the hose barb and secure with two stainless steel hose clamps.
E. Route the condensate hose down from the Marvair air conditioner to a sump or to an overboard fitting. If the drain runs overboard, it MUST NOT be within three (3) feet from the exhaust from the engine or generator. Double clamp all connections.

F. If the condensate line is run through a room or compartment containing an engine or fossil fueled device, it is imperative that the line be air tight to prevent carbon monoxide other any other hazardous gases or vapors from being introduced into the conditioned air system.

Sea or Fresh Water System

Proper water flow is absolutely critical to the operation of the Marvair air conditioner. If the pipe is too small, back pressure is created causing a drop in water flow, even if the pump is correctly sized. If the piping is too large, the slow velocity of the water may cause silt build-up and barnacle growth inside the piping, eventually restricting water flow. See Table 1, Recommended Pipe Sizes and Table 2, Minimum Water Flow.

Minimum Water Flow.

The best material for sea water piping and fittings is cupronickel. Suitable materials for piping are hi-grade bronze cupronickel and schedule 80 PVC pipe. Materials to avoid are yellow brass, copper, poor grades of aluminum, stainless steel or steel pipe. Use Teflon® tape or other appropriate sealant on all threaded fittings to prevent leaks.

1. Thru-hull fitting. Install a scoop-type thru-hull fitting as close to the keel and as far below the water line as possible to eliminate any possibility of air entering the system. Do not share the thru-hull with any other device; i.e., an engine or generator. When using one thru-hull for multiple units, the thru-hull must be sized for proper water flow.
   The scoop-type thru-hull should face forward. On a fast planning board, locate the thru-hull at the transom to ensure water flow.
2. Seacock. A bronze, full flow seacock or ball valve should be installed directly onto the thru-hull fitting. The seacock must be closed to clean the strainer and in an emergency. Therefore, make it easily accessible.
3. Strainer. The strainer must be installed so that it is always below the water line and below the pump. It should be easily accessible for cleaning. Verify that the water flow is in the correct direction. Secure the strainer to a bulk head.
4. Overboard Discharge. The overboard discharge should be no more than 2” above the water line. This will minimize sound yet allow visual confirmation of water flow. If the overboard discharge fitting must be installed below the water line, a valve must be installed per ABYC standards.

Recommended Water Pipe Sizes		
Flow Rate (GPM)	**Pump Inlet Pipe Size**	**Pump Discharge Pipe Size**
1 through 4	5/8”	5/8”

Table 1. Recommended Water Pipe Sizes

Minimum Water Flow* For Marvair Marine Self-Contained And Split Systems	
Model	**Minimum Water flow at the unit**
SMB05	1.5 GPM / 5.7 LPM
SMD14	3.0 GPM / 11.4 LPM
*Based upon 85°F (29.5°C) inlet water measured at the inlet of the unit.	

Table 2. Minimum Water Flow Chart

The Conditioned Air Duct & Grille System

⚠ WARNING CARBON MONOXIDE POISONING HAZARD

Failure to follow safety warnings could result in serious injury, death, or property damage. Do NOT operate in a corrosive atmosphere containing chlorine, flourine or any other damaging chemicals which could harm the unit and duct system, and permit spillage of combustion products into an occupied space.

Inadequate air flow is a leading cause of complaints and can significantly shorten the life of the unit, The air distribution system must be engineered to ensure sufficient air flow throughout the system. This included proper duct sizing and sufficient open area on the supply and return grilles.

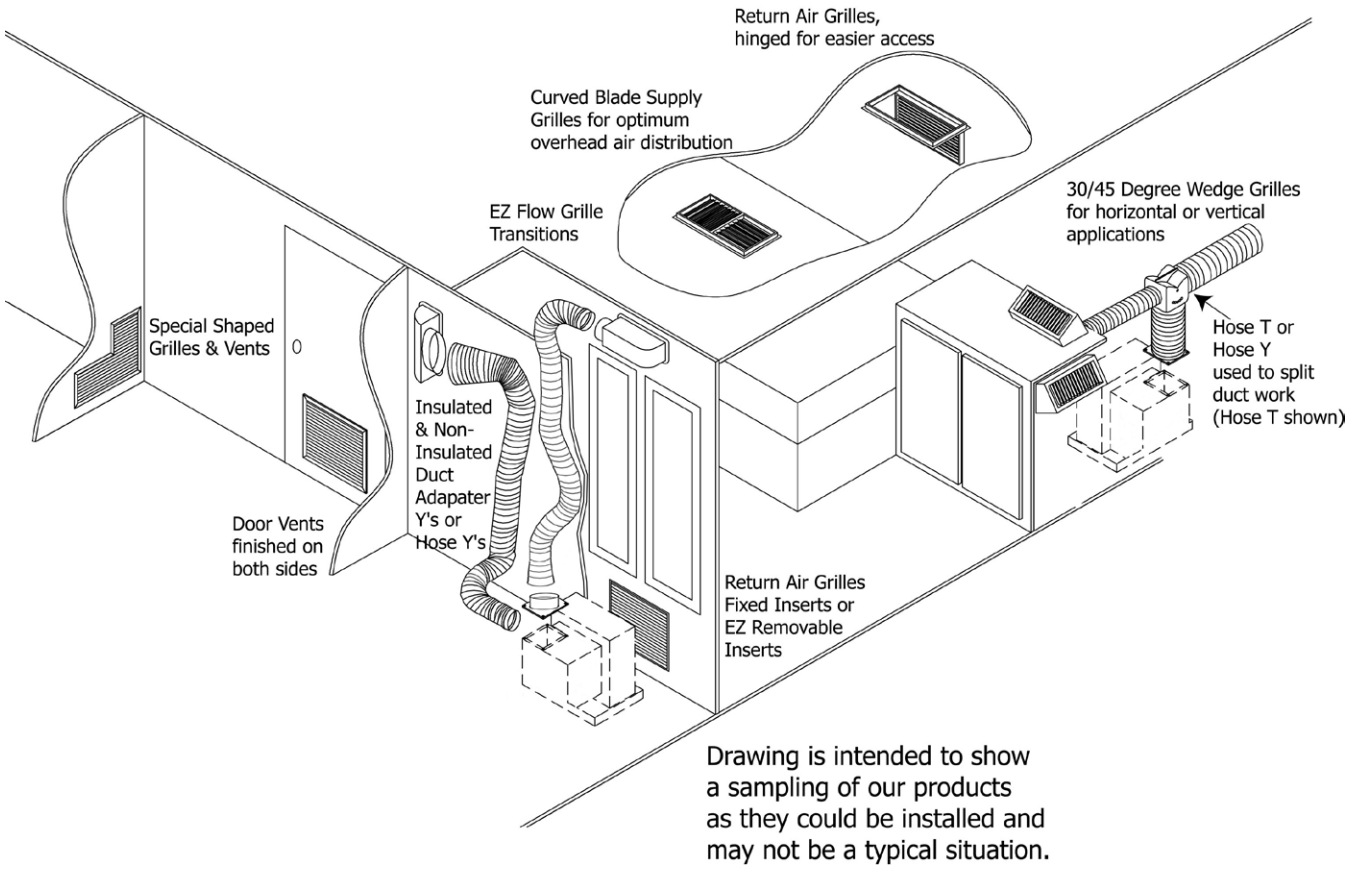

Return Air Grilles, hinged for easier access
Curved Blade Supply Grilles for optimum overhead air distribution
EZ Flow Grille Transitions
30/45 Degree Wedge Grilles for horizontal or vertical applications
Special Shaped Grilles & Vents
Insulated & Non-Insulated Duct Adapater Y's or Hose Y's
Hose T or Hose Y used to split duct work (Hose T shown)
Door Vents finished on both sides
Return Air Grilles Fixed Inserts or EZ Removable Inserts
Drawing is intended to show a sampling of our products as they could be installed and may not be a typical situation.

Figure 5. Typical Air System Installation Schematic

Duct work guidelines

- Duct work must be firmly attached, secured and sealed to prevent air leakage.
- Use transition boxes and/or plenums with duct to split and route the conditioned air as required.
- When using insulated flexible duct, make sure that the inner duct is secured and sealed to an adapter before pulling the insulation over the connection
- Install the supply air grilles high on the cabin wall to create good air circulation. Stretch the duct tight in straight runs.
- Make the bends and turns as large as possible. Secure the duct so that is remains in its installed position.
- Always use insulated duct to prevent condensation.
- Insulate all transitions and plenums.

- If duct is in a storage or a high traffic area, protect it from being crushed by a shield or box.
- If the duct must be run through areas containing engines or fossil fueled devices, it is absolutely mandatory that the duct system be air tight to prevent carbon monoxide and any other hazardous gases or vapors from being introduced into the conditioned air system.

Return Air Grilles

The return air grille should be located to ensure unimpeded air flow to the air coil on the air conditioner. The grille may be located on the opposite the coil provided there is a space around the unit for sufficient air flow. Maintain at least 4" between the grille and the Marvair® unit. For good air distribution throughout the cabin, the return grille should be located near the floor when the supply grilles are high on the cabin wall. The return air grille must have sufficient open air to permit adequate air to the indoor coil.

The Marvair air conditioner has a factory provided filter located in front of the air coil. If a return air filter grille is used, it is recommended that the filter on the unit be removed.

Supply Air Grille

The supply air grille must have sufficient open area to permit adequate air flow. To prevent short circuiting of the conditioned air, adjust the vanes of the supply grille so that the discharge air is not directed to the return air grille or to the thermostat/controller.

The SMB05 air conditioner requires a supply grille with a minimum area of 12 sq. inches (e.g., a 4" round grille). The duct should have a diameter of at least 4 inches and be no longer than 10 feet.

The SMD14 air conditioner requires a supply grille with a minimum area of 70 square inches.

Air Flow, Grille and Duct Size			
Model	**Nominal Air Flow**	**Minimum Size of Return Grille**	**Minimum Hose Size**
SMB05	125 CFM	70 sq. inches / 452 sq. cm	4" / 10.2 cm
SMD14	350 CFM	140 sq. inches / 903 sq. cm	6" / 15.2 cm

Table 3. Air Flow, Grille and Duct Sizes

Air Flow Noise

Air moving through duct work and across the blades in the grilles and louvers generates sound. The faster the air, the greater the sound. To keep sound to acceptable levels, the cross sectional area of the duct must be large enough to keep the velocity below 600 ft/min (3m/sec). Air flow faster than this is likely to cause noise complaints. The duct sizes in Table 3 are the minimum size required to deliver the proper air flow without generating undue noise. Larger ducts will have less friction and less noise.

SMB05

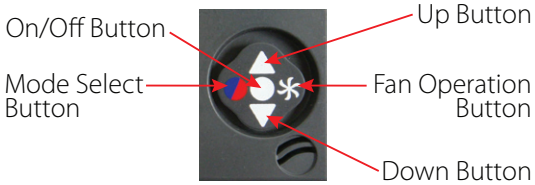
The SMB05 can be controlled by either the o-LED display or the Marvair 50176 thermostat. Before setting up either thermostat or display:

1. Turn the seacock valve to the open position, and
2. Turn on the water pump.
3. Verify the water is being discharged overboard.

Operating and Configuring the o-LED Display

Before You Start:

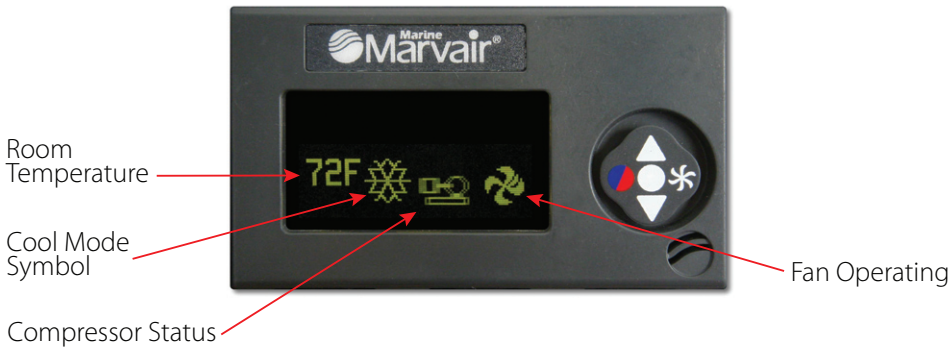
1. **Applying power:**
   When power is first applied, the display will show the software revision, and then return to the last mode the unit was in when power was removed.



2. **Joystick operation:**
   The four position joystick may be tapped up, down, right, left or in the center to make changes to the operation of the control.

Operating Modes

Screen Saver



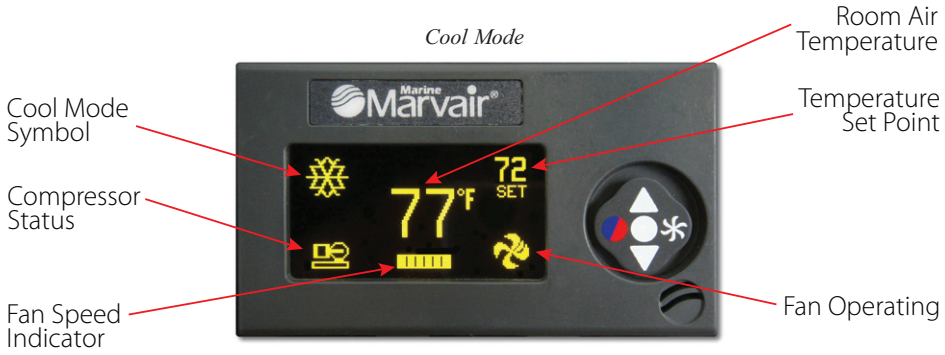
Screen Saver

In screen saver, the display will appear dim and the information will scroll across the screen. Status symbols appear as needed and operation continues in the mode selected. Screen saver is activated after two minutes without any button press in any mode. To exit screen saver, just press any button.

Off Mode

When the display is in the off mode, only the temperature will show in the center of the screen. Program mode is accessed from this mode. The fan may be operated in this mode. Press the On/Off button to enter the ON mode and select cool or moisture mode

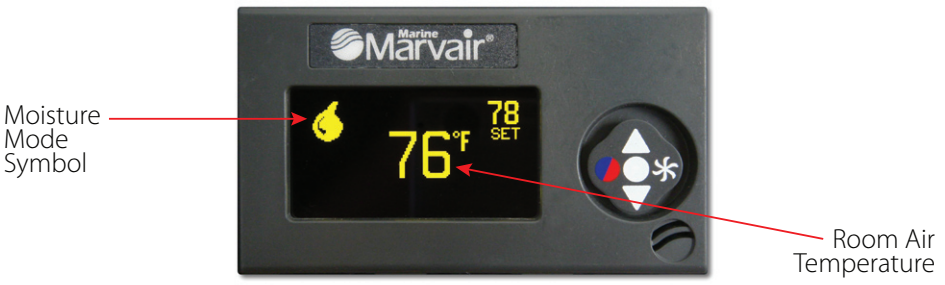
Cool Mode



Cool mode

Press the mode select button to select between cooling and moisture modes. Set the desired room temperature by pressing the up or down button. The system will provide cooling as necessary. The compressor symbol will appear when system is cooling.

Moisture Mode



Moisture Mode

Select this mode to help control humidity in the room while the room is unoccupied. The control will operate in cooling mode for up to 1 hour every 6 hours.

Operating The Fan

The fan can be turned on while the system is off by pressing the fan button. See programmable parameters for details on fan operation when the system is running.

Viewing Battery Voltage

In the ON mode, press and hold the mode select button for three seconds. The display will show the battery voltage.

Air Sensor Trouble

If the air sensor in the display fails, AIR SENSOR TROUBLE will be displayed. If this happens, the display must be repaired or replaced.

Programmable Parameters

Descriptions of programmable parameters, factory default values, and allowable values are shown in the table below.

Entering The Program Mode:

To enter the program mode first put the unit in the off mode. Press the following sequence of buttons: Mode, Up, Down, Mode. CYCLED FAN will appear as the first program parameter. Use the fan button to advance to the next parameter and the mode button to go back to the last parameter. Use the up and down buttons to change the parameters value. Exit the program mode when finished by pressing and releasing the On/Off button. The program mode will exit to the off mode if no button is pressed for 60 seconds.

Programmable Parameter Table A

Description	Default	Value
Cycled Fan	Continuous	Cycled or Continuous
System Units	°F	°F or °C
Display Brightness	15	4=Minimum 15=Maximum
Screen Saver Brightness	4	- and 1-8
Temperature Calibration	0	Ambient +/- 10°F
Staging Delay	15	5 to 135 Seconds
Failsafe Level	Not active or operational	
Low Battery Detection	10.6 VDC	Off, 8.6 to 11.9 VDC
Voltage Calibration	System Voltage	0 to 25.5 VDC
Over Current Limit	Valid only with adapter board	
Current Calibration	Valid only with adapter board	
De-Ice Time	Off	Off, 30 to 90 seconds
Use Option Sensor For	Valid only with adapter board	
Pump Sentry	Valid only with adapter board	
Reset Parameters	No	No or Yes

Parameter Description

- Cycled fan: When this parameter is set for “Cycled” and the display is in the ON mode, the fan will operate on whenever the compressor is running. When set for “Continuous”, the fan will always operate when the system is in the ON mode.
- System units: Degrees Fahrenheit (°F) or degrees Celsius (°C) can be selected
- Display brightness: Display brightness can be set from 4 to 15 to suit room lighting.
- Screen saver brightness: If set for (-) then a single bar will blink sequentially in the four corners of the display. Values from 1 to 8 can be set to suit room brightness. Temperature calibration: This parameter allows the user to calibrate the room air temperature sensor. The room temperature will be displayed and can be adjusted +/-10 °F or +/-5°C
- Staging delay: This parameter sets the length of time to wait before starting the compressor after power is applied if there is an immediate demand. The control will also wait one minute plus this time between cycles to start the compressor. This is used to prevent short cycling of the compressor.
- Fail safe level: Not active or operational.
- Low battery detection: When set, if the battery voltage remains below the set value, the system will follow the action set by the failsafe level.
- Voltage calibration: Use this parameter to adjust the internal voltmeter to the battery voltage.
- Over current limit: Valid only with optional adapter board.
- Current calibration: Valid only with optional adapter board.
- De-Ice time: When set, the system will perform the evaporator deicing program.
- Use option sensor for: Valid only with optional adapter board.
- Pump sentry: Valid only with optional adapter board
- Reset parameters: To reset all parameters to factory defaults, select YES and then exit the program mode by pressing the joystick center button. The display will show “EEPROM RESET”, and then show the room temperature in the off mode.

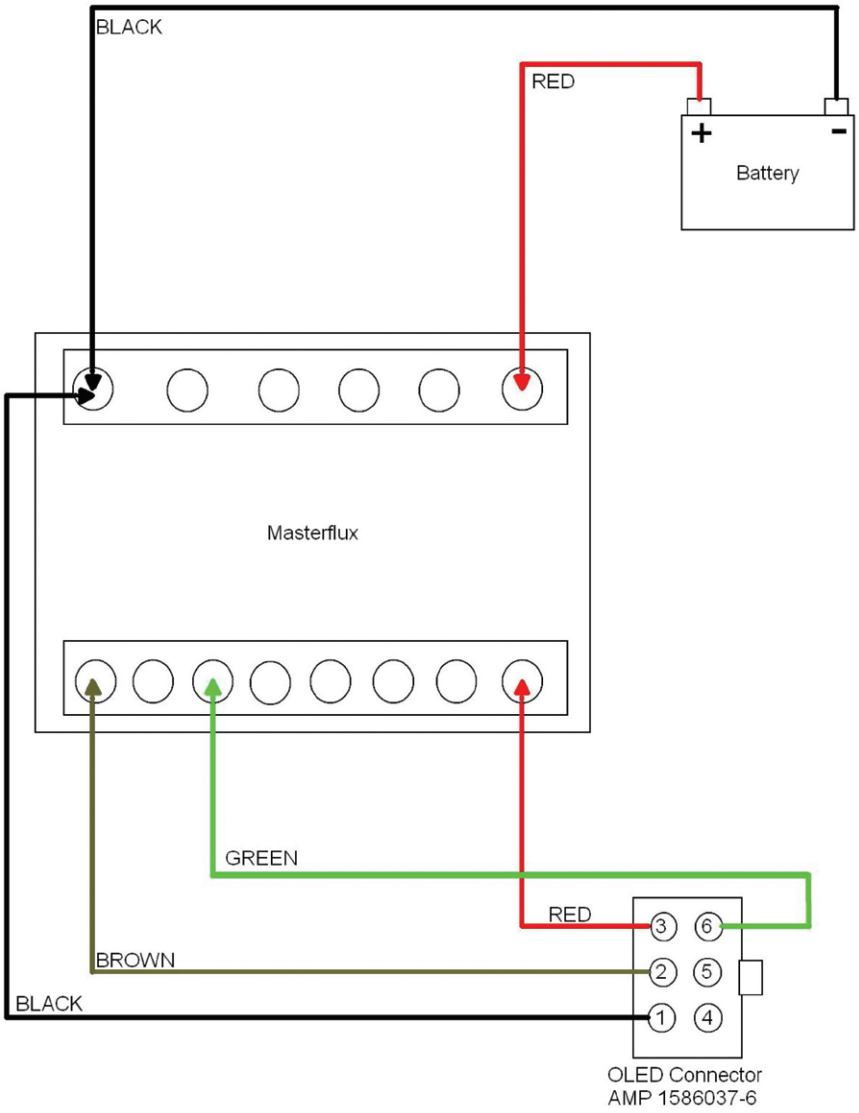


Figure 6. MasterFlux Wiring Diagram

Specifications

Set point range	55°F to 85°F 12.7°C to 29.4°C
Ambient temperature range displayed	5°F to 150°F
Sensor accuracy	+/-2°F at 77°F
Line high voltage limit	15 VDC
Minimum operating temperature	0°F
Maximum operating temperature	180°F
Maximum RH conditions	95% Non condensing
Maximum length of the display cable	75 Feet
Maximum length for sensor cables	50 Feet

Operating and Configuring the 50176 Thermostat

⚠ CAUTION

This thermostat should be installed by trained technicians only. Adhere to all local and national codes. Disconnect all power to the system before installing, removing, or cleaning.

Operation

The display indicates room temperature and the word ROOM is shown on the LCD. When in cool mode and the temperature selector is pressed; the display temporarily indicates the setpoint temperature and the word SET is shown on the LCD. Each time the UP arrow is pressed, the setpoint will increase. Each time the DOWN arrow is pressed, the setpoint will decrease. Once the temperature selector button is no longer pressed for a few seconds, the room temperature will again be displayed, and the word ROOM will be displayed on the LCD.

Temperature

Mode	Range	
	ºF	ºC
Cooling (set)	90°F to 45°F	32°C to 7.0°C
Display (room)	99°F to 32°F	38°C to 0°C

Note:

The temperature is displayed in degrees Fahrenheit as a factory set default . To display in degrees Celsius, see "Configuration".

There is a three-minute anti-short cycle delay time for cooling.

Refer to operation chart for a more detailed listing of operation sequence.

Application

The thermostat wiring must be a minimum of 18 gauge. The 50176 thermostat may also operate any 12 VDC control circuit not exceeding 1 amp.

Operation Chart

The chart below shows the system functions with the 50176 thermostats. After the entire air conditioning system is installed, check each position function.

	Mode Switch	Fan Mode Switch	Fan Speed Switch*	Calling	Operation of Unit
1	Cool	Auto	Lo	No	No functions occur in this mode
2	Cool	Auto	Lo	Yes 1° above set	GL-FAN (Gray), Y-Compressor (Yellow) energized
3	Cool	On	Lo	No	GL-FAN (Gray) energized
4	Cool	On	Lo	Yes 1° above set	GL-FAN (Gray), Y-Compressor (Yellow) energized
5	Cool	Auto	Hi	No	No functions occur in this mode
6	Cool	Auto	Hi	Yes 1° above set	GH-FAN (Green), Y-Compressor (Yellow) energized
7	Cool	On	Hi	No	GH-FAN (Green) energized
8	Cool	On	Hi	Yes 1° above set	GH-FAN (Green), Y-Compressor (Yellow) energized
9	Off	Auto	Lo or Hi		No functions occur in this mode
10	Off	On	Hi		GL-FAN (Gray) energized
11	Off	On	Hi		GH-FAN (Green) energized

*Note: There is only one fan speed on the SMB05.

Installation

⚠ WARNING

Be sure all electrical power has been disconnected from the air conditioner and the power supply.

These instructions are provided for the proper mounting of the thermostat itself. An Operation Chart is provided to show thermostat capabilities.

A. THERMOSTAT LOCATION

This thermostat is a sensitive instrument. For accurate temperature control and comfort, the following considerations should be taken into account:

1. Locate the thermostat on an inside wall about five feet above the floor. Pick a dry area where air circulation is good.
2. Do not install the thermostat where there are unusual heating conditions such as direct sunlight, heat producing appliances (television, radio, wall lamp, etc.) or a furnace or air conditioner supply register.

B. WIRING THE WALL THERMOSTAT

The OEM must supply the stripped wires to mate per Figure 7. The wires must be connected by wire nuts to wiring harness before the base is secured to the wall.

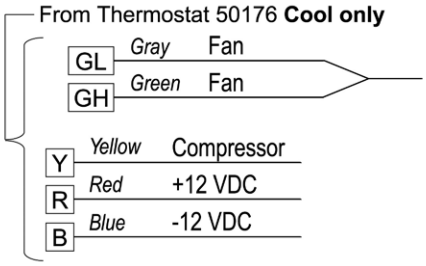


Figure 7. Wiring the Wall Thermostat

C. ATTACHING THE WALL THERMOSTAT

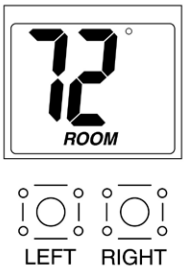
1. Separate the thermostat cover from the base by gently pulling at the top corner.
2. Connect wires to the wiring harness.
3. Attach the new thermostat base to the wall at the desired mounting location.
4. Reattach thermostat cover to base.

Configuration Mode

The configuration mode is used to set the 50176 to match your system.

To configure the 50176, perform the following steps:

1. Verify the 50176 is in the **OFF** mode.
   Slide the mode switch to the right position until off mode displays.
2. Remove the cover of the thermostat by gently pulling near one of the corners at the top of the thermostat.
3. Press both the **LEFT** and **RIGHT** switches for 1 second while the 50176 is in **OFF** mode.



Press the **up** or **down** button to change settings within each screen.

Press the **RIGHT** switch to advance to the next screen.

Note: *Pressing the **LEFT** switch will return you to the previous screen.*

To exit configuration mode, press both the **LEFT** and **RIGHT** switches for 1 second or slide the mode switch to cool.

Configuration Mode Settings

The setup screens for Configuration Mode are as follows:

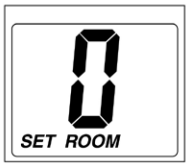
1. **Temperature Scale** (F or C) – Choose Fahrenheit or Celsius.
   Press the **up** or **down** button to select.
   Press the **RIGHT** switch to advance to the next screen.

2. **Temperature Differential** (1°F to 5°F) (1°C to 3°C) – Set the number of degrees between your "setpoint" temperature and your "turn on" temperature.
   Press the **up** or **down** button to set differential value.
   Press the **RIGHT** switch to advance to the next screen.

3. **Lockout** (0°F-8°F) (0°C-8°C) – Select the number of degrees set temperature can be changed during keypad lockout
   Press the **up** or **down** button to select.
   Press the **RIGHT** switch to advance to the next screen.

4. **Minimum Cool Setpoint** (45°F to 90°F) (7°C to 32°C)
   Adjust to control the minimum cool set temperature allowed.
   Press the **up** or **down** button to select.
   Press the **RIGHT** switch to advance to the next screen.
   IMPORTANT: DO NOT SET THE MINIMUM COOL SET POINT BELOW 68°F (19°C).

5. **Room Temperature Offset** (+9°F to -9°F) (+5°C to -5°C)
   Adjust to calibrate displayed room temperature to match actual room temperature.
   Press the **up** or **down** button to select.
   Press the **RIGHT** switch to advance to the next screen.



6. **Maximum Cycles Allowed Per Hour** (- -, 2-6)
   - - = as many as needed, 2-6 = maximum cycles/hour
   Press the **up** or **down** button to select.
   Press the **RIGHT** switch to advance to the next screen.
   Marvair recommends a setting of "as many cycles as needed"

To exit configuration mode, press both the LEFT and RIGHT switches for 2 seconds or slide the mode switch to cool.

SMD14

The SMD14 is controlled by the o-Touch display.

Operating and Configuring the o-Touch Display

Before setting up either thermostat or display:

1. Turn the seacock valve to the open position,
2. Turn the water pump on, and
3. Verify the water is being discharged overboard.

Introduction:

When connected to a 12-24VDC controller, the versatile o-Touch DC digital display provides room temperature control and humidity reduction in a small package. It allows for easy control of fan speed, operating mode and temperature in a wide variety of applications.

Features include:

- Easy touch screen operation.
- Built in room temperature sensor.
- The display is compatible with Vimar and Gewiss frames.
- Visual symbols enable the viewer to see the operating status at a glance.
- Easily programmed for customized operation.
- Both automatic and manual six level fan speed control.
- De-icing cycle to prevent evaporator icing.
- Automatic moisture mode provides relative humidity control.
- Variable compressor speed control reduces power consumption as ambient temperature approaches the set point.
- Compressor current limiting can be used to prolong battery life.

Operation

Applying Power

When power is first applied, the display will show the software revision, and then return to the last operating mode the unit was in when power was removed.

Screen Saver
In screen saver, the display will appear dim and the information will scroll across the screen. Status symbols appear as needed and operation continues in the mode selected. Screen saver is activated after two minutes without touching the screen in any mode. To exit screen saver, just touch the screen.

Off Mode
When the display is in the off mode, the temperature will show in the center of the screen along with the fan and on / off symbol. The fan may be operated in this mode by pressing the fan symbol. Press the On/Off button to access other operating modes.

Operating Modes
Two operating modes are available and can be changed by pressing the symbol in the upper left corner. The symbols below will appear in the upper left on the display.

Moisture Mode Symbol

Cool Mode Symbol

Set the desired room temperature in cooling mode by pressing the set point in the upper right corner. Use the arrows to raise or lower the set point and press X when you are finished.

Moisture mode is used to help control humidity in the room while the room is unoccupied. The control will operate in cooling mode for up to 1 hour every 6 hours.

Operating the Fan
Fan speed may be set for automatic (temperature dependent) or manual control. Press the fan operating symbol in the bottom right corner to change speeds. Manually selected fan speed is indicated with the M showing before the fan speed indicator. When the fan is automatically controlled, the M is not present. The fan may be controlled in the cool, heat, automatic modes as well as in the off state.

Manual fan speed operation is not available when the compressor is not running if the "Cycled Fan" option is set. Turn the unit off in this case and then manual fan operation may be used. Manual fan speed operation is also not available in moisture mode.

Viewing System Status

Several system operating parameters can be viewed during operation as shown above. Press and hold the lower center of the display (where the fan speed indicator is located) to view this status. To exit the status view, press anywhere on the display.

The system current is available at all times, the remaining items only during compressor operation.

Failure Messages
The following fault messages will be shown on the display in the event of a failure:

AIR SENSOR TROUBLE: Failure of the display mounted air sensor.

MASTERFLUX GENERATED ERRORS: Errors generated by the Masterflux controller will also show on the display. The exact text of these errors is dependent on the connected controller. See the operating manual for your Masterflux controller for details and resolution of these errors.

Programmable Parameters:

Program Mode

To enter the program mode first put the unit in the off mode. Then press and hold the On / Off symbol for 3 seconds. Press the right arrow to advance to the next parameter and press the left arrow to go back to the last parameter. Press the up or down arrows to change the parameters value. Exit the program mode when finished by pressing the X or wait 60 seconds for the display to exit.

Parameter Description:

- **Cycled fan:** When set for “Cycled”, the fan will operate on demand. When set for “Continuous”, the fan will always operate when the system is in cool mode.
- **System units:** Degrees Fahrenheit (°F) or degrees Celsius (°C) can be selected
- **Display brightness:** Display brightness can be set from 4 to 15 to suit room lighting conditions.
- **Screen saver brightness:** If set for (0) then a single bar will blink sequentially in the four corners of the display. Values from 1 to 8 can be set to suit room lighting conditions.
- **Temperature calibration:** This parameter allows the user to calibrate the room air temperature sensor. The room temperature will be displayed and can be adjusted +/-10 °F or +/-5°C
- **Staging delay:** The compressor staging delay is provided for multi system installations. Set the Staging delays at different intervals so only one compressor starts at a time when power is applied.
- **De-Ice Time:** If the compressor runs continuously for longer than one hour, the compressor will shut down and the blower will run for the specified time. The compressor will then restart and resume operation.

- **Cycled pump:** When set for “Cycled”, the pump will run on demand. When set for “Continuous”, the pump will run continuously when the system is in cool mode.
- **Fan speed 1-6:** These parameters are used to optimize fan performance and airflow Speed 1 corresponds to the lowest speed setting. Speed 6 corresponds to the highest speed setting. Speeds should be set to avoid system icing in humid environments.
- **Maximum comp current:** Thirty seconds after starting a cooling cycle the compressor current will be limited to this value.
- **Compressor speed range:** The number of degrees from set point to maximum compressor speed.
- **Reset parameters:** To reset all parameters to factory defaults, select YES and then exit the program mode by pressing the on / off button. The display will show “EEPROM RESET”, and then show the room temperature in the off mode.

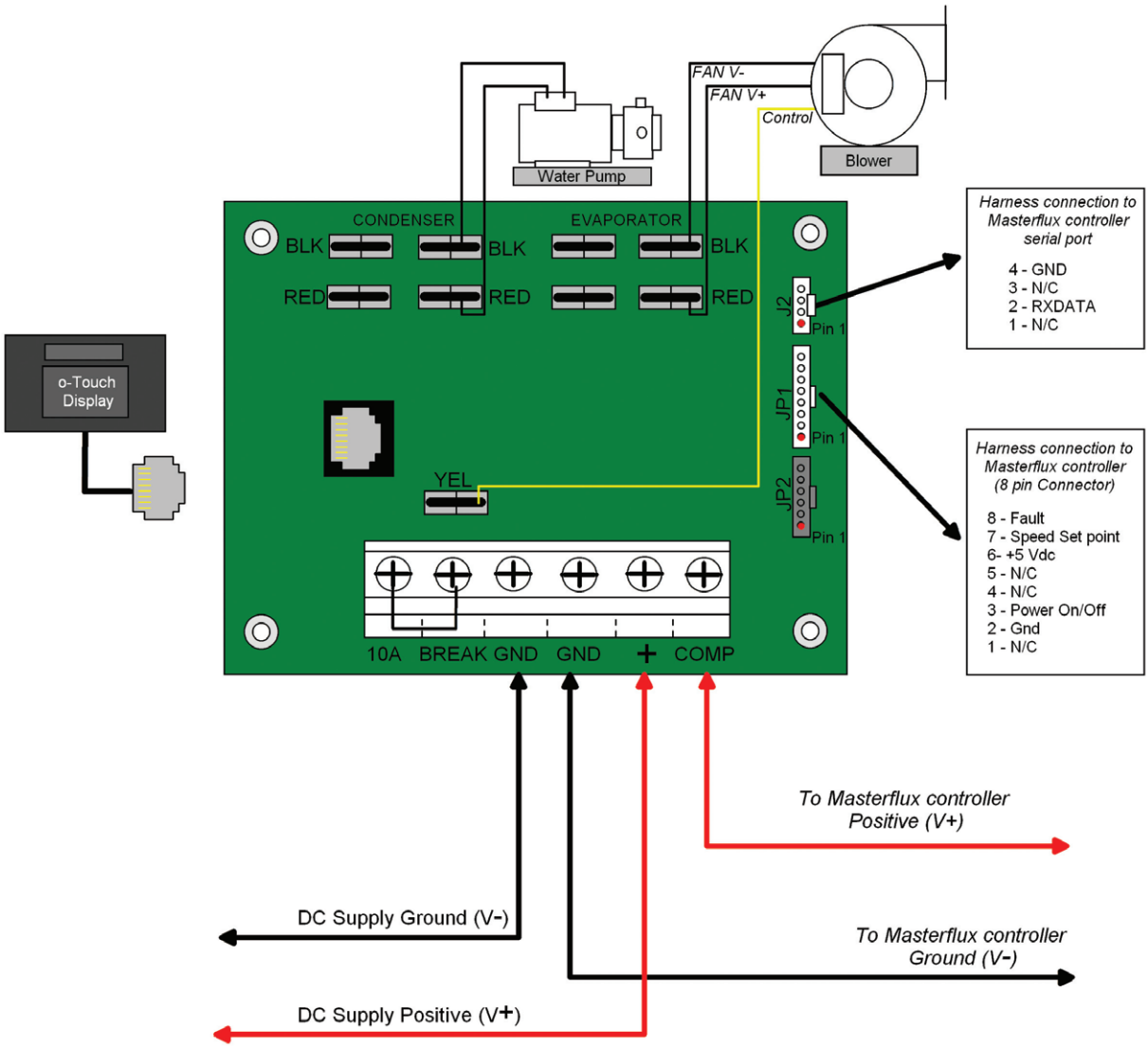
Programmable Parameter Table

Description	Default	Value
Cycled Fan	Continuous	Cycled or Continuous
System Units	°F	°F or °C
Display Brightness	15	4=Minimum 15=Maximum
Screen Saver Brightness	4	- and 1-8
Temperature Calibration	0	Ambient +/- 10°F
Staging Delay	15	5 to 135 Seconds
De-Ice Time	2	1 - 5 Minutes
Cycled Pump	Cycled	Cycled or Continuous
Fan A Speed 1	30	30-90
Fan A Speed 2	35	30-90
Fan A Speed 3	40	30-90
Fan A Speed 4	45	30-90
Fan A Speed 5	55	30-90
Fan A Speed 6	85	30-90
Compressor Speed Range	2 (1.1)	2-5 °F (1.1-2.8 °C)
Maximum Comp Current	35	Off, 10-60 Amps
Reset Parameters	No	No or Yes

Specifications

Set point range	55°F to 85ºF 12.7°C to 29.4°C
Ambient temperature range displayed	5°F to 150°F -15°C to 65.6°C
Sensor accuracy	+/-2°F at 77°F +/-1.1°C at 25°C

Evaporator Output MAX	10 Amps
Condenser Output MAX	10 Amps
System Current MAX	60 Amps
Minimum operating temperature	0°F 17.8°C
Maximum operating temperature	180°F 82.2°C
Maximum RH conditions	95% Non-condensing
Maximum length of the display cable	75 Feet 22.86 m



Note: The wires to the blower, to the MasterFlux controller and to the harness connections to the MasterFlux controller are factory installed.

1. Turn the seacock valve to the open position.
2. There is a short delay on starting.
3. If the water pump has a dedicated breaker, turn it on. Verify that water is being discharged overboard.
4. Turn on the circuit breaker to the Marvair unit.
5. Refer to the operating instructions in this manual for your thermostat/controller and set the system for cooling by using the display module or the thermostat.
6. Adjust the cooling temperature set point on the display module or the thermostat higher than the cabin temperature.
7. Slowly lower the thermostat's cooling set point until the set point is below the cabin temperature. The blower, compressor and pump should be operating.
8. Close all doors and hatches.
9. Allow the unit to operate 10 minutes.
10. After 10 minutes, there should be a 15°F (8°C) to 20°F (9°C) difference in the supply and return air temperatures.

Operation Checklist

1. Verify that all tie downs clamps have been correctly installed.
2. Make sure all electrical cover plates are in place.
3. Test for continuity between the ground and the boat's bonding system or the engine's DC negative connection.
4. Make sure that there are zero volts between the boat's ground and the ground in the air conditioner with the unit operating.
5. Check all water hoses for leaks.
6. Make certain that poisonous gases or noxious fumes are NOT being introduced into the vessel via the HVAC system.
7. Check for proper condensate drainage.

Chapter 7 – Winterizing the System

There are two scenarios for winterizing the system – the boat remains in the water or the boat is out of the water, in dry dock storage. Please follow the procedures described below for your situation.

Boat remains in the water

In water storage requires the use of a potable anti-freeze solution throughout the system's water supply and discharge lines. Be sure to follow all state, local and federal ordinances before discharging an anti-freeze solution overboard.

1. Close ball valve.
2. Disconnect water line at ball valve.
3. Insert line into a bucket of potable anti-freeze.
4. Run air conditioner until a solid stream of anti-freeze is being discharged overboard.
5. Reconnect water line at ball valve.

Boat is out of water in dry dock

With the boat out of the water:

1. Open the seacock to permit all the water to drain out of system via the thru-hull fitting.
2. Remove and empty the seawater strainer basin.
3. Loosen the screws on the pump head to allow the water to drain from the pump and from the water line between the pump and strainer.
4. Close the seacock.

When the boat is put back into the water in the spring:

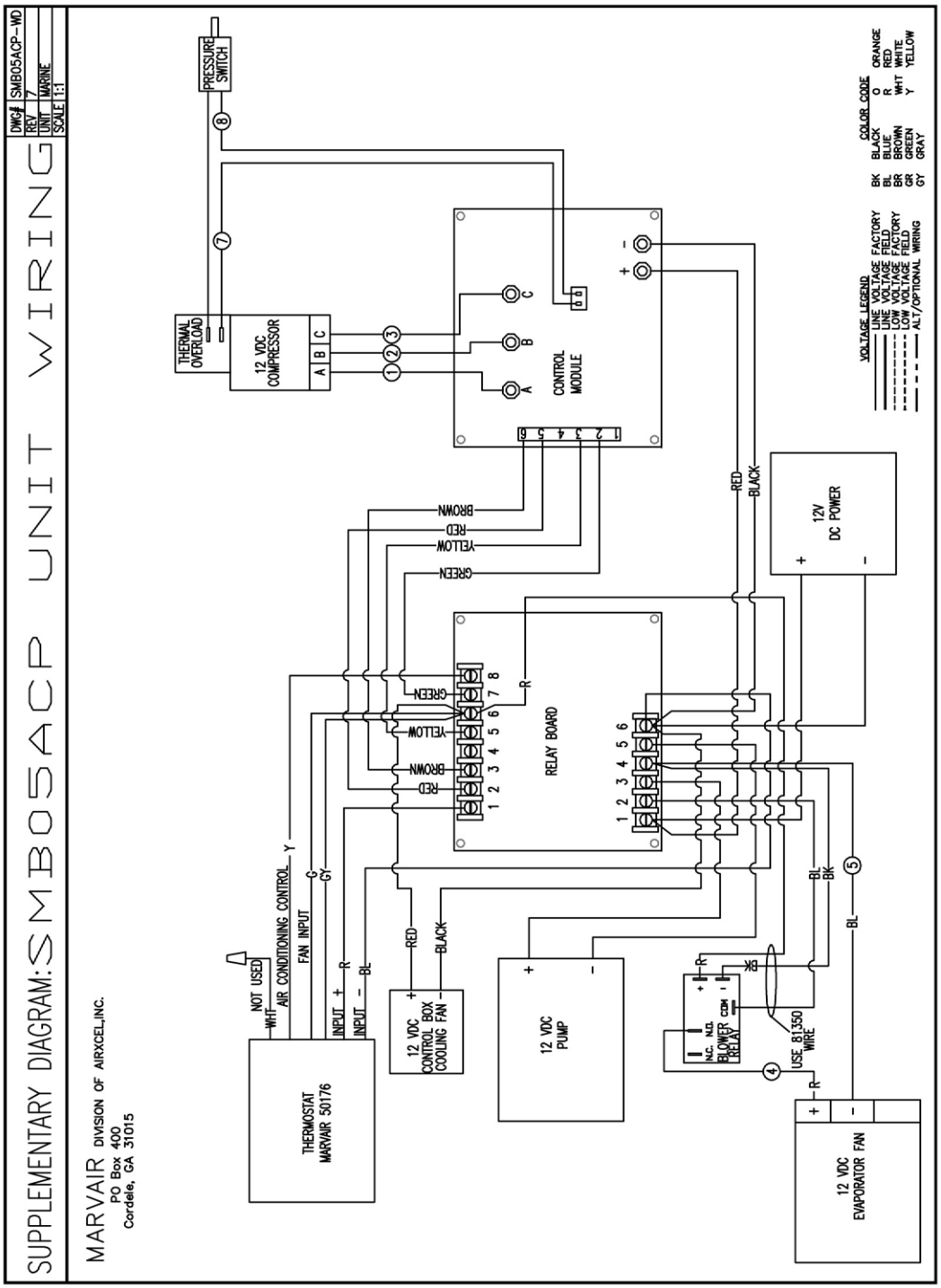
1. Gradually open the seacock to allow water to fill the system to the level of the pump.
2. Tighten the pump face to achieve a seal.
3. Open the seacock valve completely.

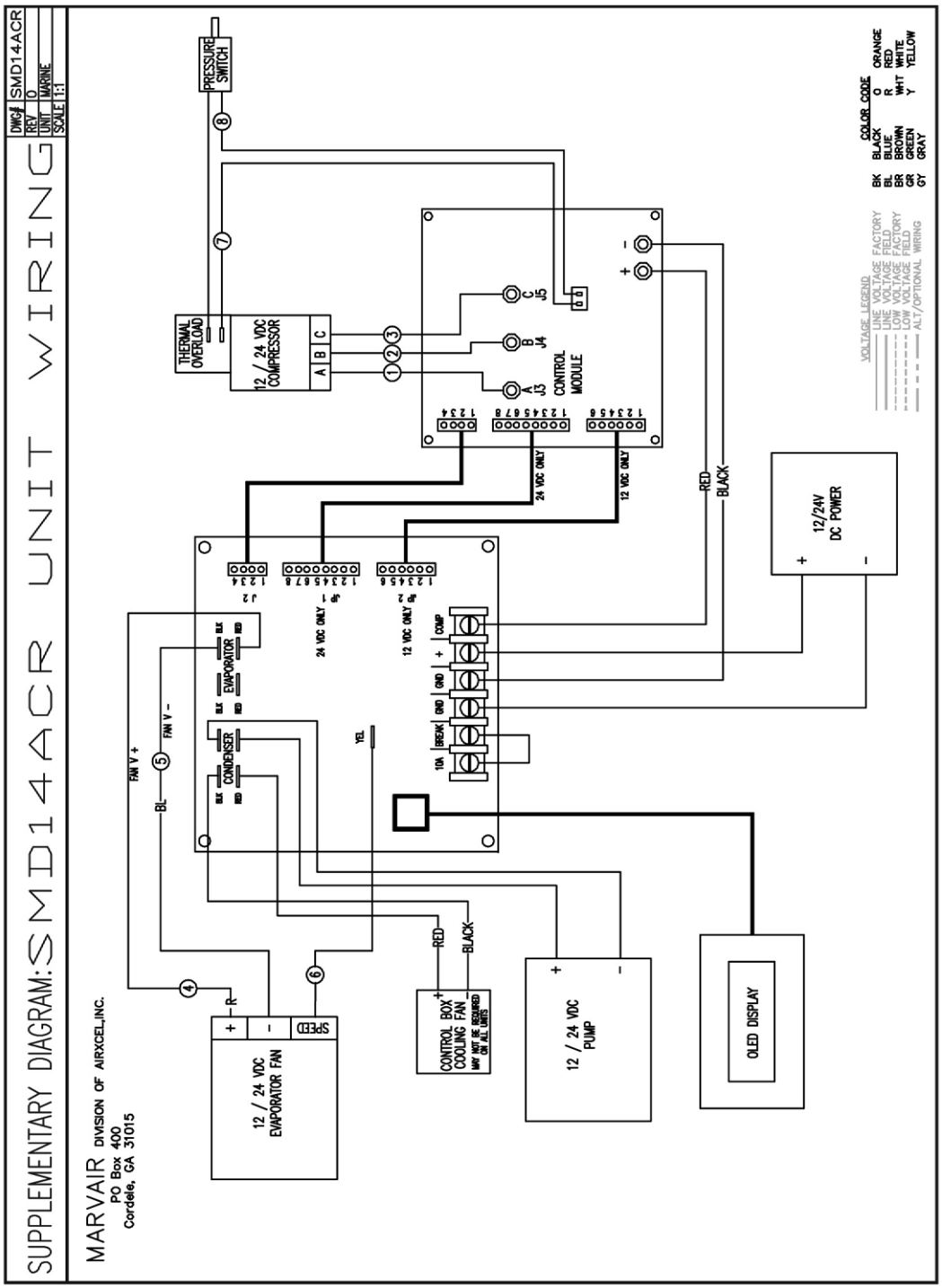
Troubleshooting the SMB05 and SMD14 Air Conditioners

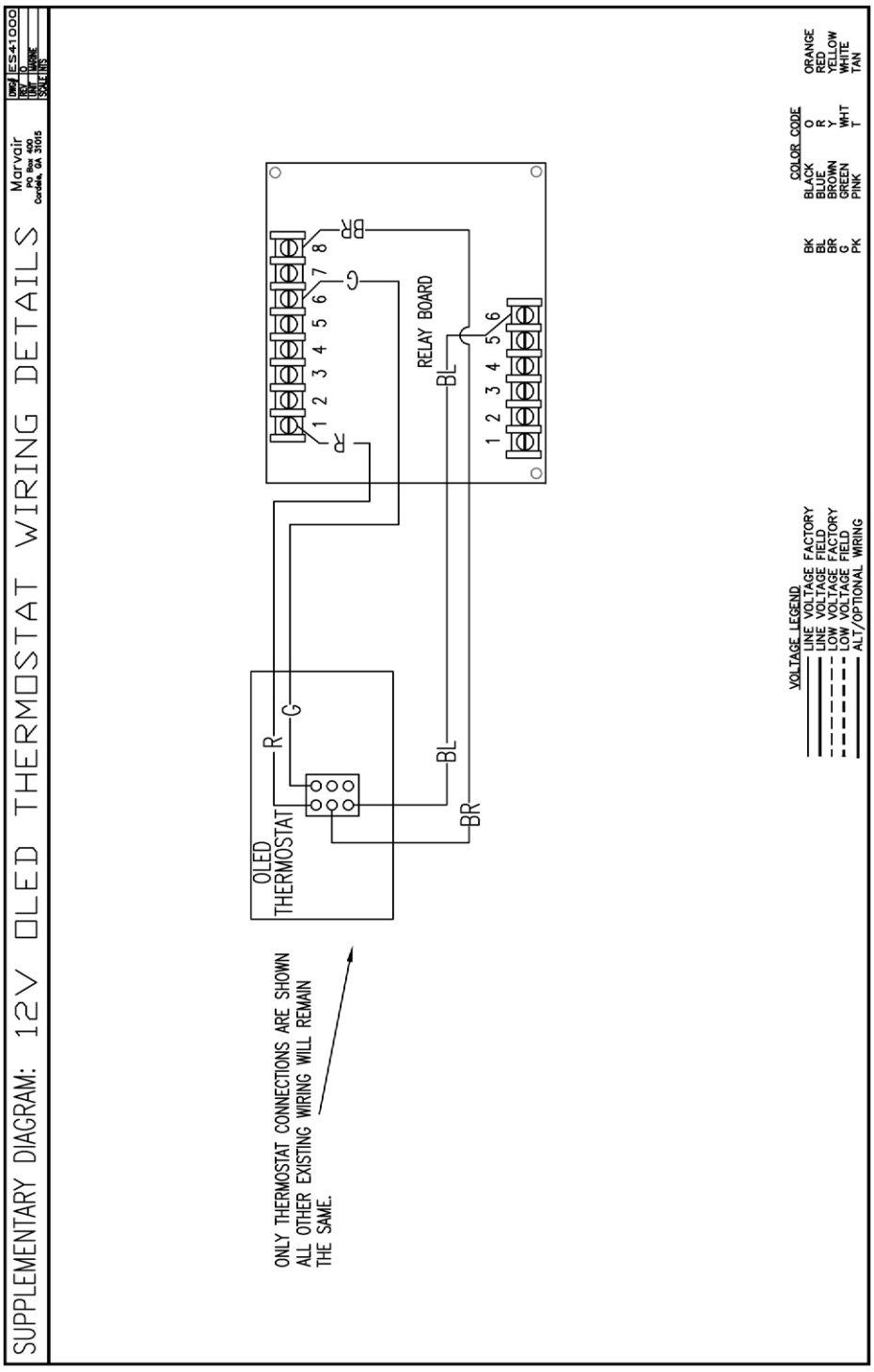
PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
The unit does not operate. (Nothing works at all)	1. Power supply problem (Low voltage)	1. Check voltage at power supply and at the electrical box. Min voltage should be >90% of rating. Check wiring to unit and at shore, boat and unit (if applicable) breakers or fuses. Check shore power connections at battery and at unit.
	2. Tripped breaker/disconnect.	2. Check circuit protection devices for continuity.
	3. Display/Controller	3. Setpoint may be too high; check unit and reset. Thermostat may be out of calibration or otherwise defective. Also check for loose connection(s).
Unit has power, but display/controller is inactive.	1. Check interface cable connections	1. If connections are good, control may be faulty. Replace.
Blower runs but compressor does not start	1. Power supply problem.	1. Check voltage at power supply and control box. Check for loose wires. Voltage must be within 10% of rated nameplate voltage.
	2. Display/Controller.	2. Check the display/controller and unit for loose wires. Secure any loose connection. Fan is typically programmed to run with the compressor. Adjust set points or reset defaults. Make sure thermostat is not in FAN ONLY mode. The thermostat should be replaced if defective.
	3. Safety switches are tripping out unit	3. Check for water flow. Check for proper air flow. Check refrigerant charge. Check switches for loose wire connection, broken or burned contacts.
	4. Loose or defective wires	4. Check for loose wires connections. Replace terminals if they are loose or weak.
	5. Compressor	5. Check for power to compressor on PC board. Check for electrical shorts, ground and open circuits. Replace compressor if defective.
	6. Refrigerant leakage or loss	6. Locate leak(s), reclaim, repair, evacuate and recharge unit with refrigerant.
	7. Control board	7. Verify that power is being provided from the control board. Replace control board if it is defective
	8. Low amps	8. Load test batteries to make sure they are fully properly charged.

PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
Compressor runs, but blower will not run.	1. Blower motor.	1. Check for electrical shorts, ground and open circuits. Replace blower motor if it is defective.
	2. Power supply problem.	2. Check voltage at power supply. Voltage at unit must be within 10% of rated nameplate voltage
	3. Control board	3. Verify that power is being provided from the control board. Replace control board if it is defective
Unit trips off on high pressure but pump is running	1. Low water flow to the condenser	1. Check water lines to the unit for kinks in line. Check strainer and thru hull for obstructions. Clean as required. Verify seacock (ball valve) is open. Check for obstruction in the pump and remove
	2. Pump is air locked	2. Purge air from system
Water pump does not run.	1. Compressor is off and the pump is programmed to run with the compressor.	1. Adjust room set point to call for cooling. That will bring the water pump and compressor on.
	2. No power to pump at control board.	2.Control board may be faulty
	3. Faulty pump	3. Replace pump.
Low air flow	1. Dirty filter.	1. Clean filter.
	2. Return air flow blocked.	2. Remove obstruction.
	3. Louvers in grille closed.	3. Open louvers.
	4. Fan speed set too low	4. Raise fan speed if in Manual or set to Auto.
Low water flow	1. Restriction or blockage in waterline.	1. Clean raw water strainer. Clean thru hull. Make sure valve is open. Clean pump.
	2. Air lock in pump	2. Open ball valve, remove discharge hose and open valve to bleed air from the pump. Check pump's impellor for wear or debris
Unit provides insufficient cooling	1. Restriction in water system.	1. Strainer or thru-hull fitting are clogged. Clean and check for water flow. Make sure seacock (ball valve) is open
	2. Water pump defective/ undersized.	2. Check for electrical shorts, ground and open circuits. Replace water pump if it is defective. Replace water pump if it is undersized
	3. Air filter.	3. Clean or replace the air filter if it is dirty.
	4. Indoor coil.	4. The indoor coil may require cleaning if the unit was operated without a filter.
	5. Ice on indoor coil	5. Thermostat setting is too low. Shut down unit until ice has melted and restart at a higher temperature setting. Check to see if filter is dirty or long or restricted ductwork.
	6. Unit is undersized	6. Check if the unit is undersized for the load. Replace with larger unit or add additional unit(s) if necessary
	7. Low refrigerant	7. Add refrigerant

PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
Loud operation.	1. Copper tubing is vibrating.	1. Adjust by bending slightly to a more stable position. Separate any tubing that is making contact with other tubing or components.
	2. Indoor blower assembly	2. If blower wheel is hitting housing, adjust the wheel position in the housing. Replace blower motor or assembly if the bearing(s) are defective.
	3. Loose cabinet or components.	3. Check and tighten loose screws
	4. Improper unit installation	4. Make sure unit is level and secure to deck.
Water is leaking from unit	1. Condensate pan.	1. Check for leaks and repair as required.
	2. Condensate drain line or pump.	2. Check for leaks and repair as required.
	3. Loose fittings or connections	3. Tighten fittings and connections. Check the condensate drain line for leaks
Electrical shock at unit.	1. Electrical component is shorted to ground	1. Check control board, blower motor, compressor and pumps with an ohmmeter or high potential tester. Determine what is grounded and replace or rewire.


SUPPLEMENTARY DIAGRAM: SMB05ACP UNIT WIRING
DWG# SMB05ACP-WD
REV 7
UNIT MARINE
SCALE 1:1
MARVAIR DIVISION OF AIRXCEL, INC.
PO Box 400
Cordele, GA 31015
PRESSURE SWITCH
THERMAL OVERLOAD
12 VDC COMPRESSOR
CONTROL MODULE
RELAY BOARD
12V DC POWER
12 VDC CONTROL BOX COOLING FAN
12 VDC PUMP
BLOWER RELAY
12 VDC EVAPORATOR FAN
THERMOSTAT MARVAIR 50176
NOT USED
AIR CONDITIONING CONTROL
FAN INPUT
INPUT +
INPUT –
USE 81350 WIRE
VOLTAGE LEGEND
LINE VOLTAGE FACTORY
LINE VOLTAGE FIELD
LOW VOLTAGE FACTORY
LOW VOLTAGE FIELD
ALT/OPTIONAL WIRING
COLOR CODE
BLACK BK
BLUE BL
BROWN BR
GREEN GR
GRAY GY
ORANGE O
RED R
WHT WHITE
Y YELLOW


SUPPLEMENTARY DIAGRAM:SMD14ACR UNIT WIRING
DWG# SMD14ACR
REV 0
UNIT MARINE
SCALE 1:1
MARVAIR DIVISION OF AIRXCEL,INC.
PO Box 400
Cordele, GA 31015
PRESSURE SWITCH
THERMAL OVERLOAD
12 / 24 VDC COMPRESSOR
CONTROL MODULE
24 VDC ONLY
12 VDC ONLY
RED
BLACK
12/24V DC POWER
EVAPORATOR
CONDENSER
COMP
GND
BREAK
10A
FAN V+
FAN V-
BL
YEL
12 / 24 VDC EVAPORATOR FAN
SPEED
CONTROL BOX COOLING FAN
12 / 24 VDC PUMP
OLED DISPLAY
VOLTAGE LEGEND
LINE VOLTAGE FACTORY
LINE VOLTAGE FIELD
LOW VOLTAGE FACTORY
LOW VOLTAGE FIELD
ALT/OPTIONAL WIRING
COLOR CODE
BK BLACK
BL BLUE
BR BROWN
GR GREEN
GY GRAY
O ORANGE
R RED
WHT WHITE
Y YELLOW


SUPPLEMENTARY DIAGRAM: 12V OLED THERMOSTAT WIRING DETAILS
Marvair
PO Box 400
Decatur, GA 31015
DWG ES+1000
REV D
SCALE NONE
OLED THERMOSTAT
R
C
BL
BR
RELAY BOARD
1 2 3 4 5 6 7 8
1 2 3 4 5 6
RR
G
BL
BR
ONLY THERMOSTAT CONNECTIONS ARE SHOWN
ALL OTHER EXISTING WIRING WILL REMAIN
THE SAME.
VOLTAGE LEGEND
LINE VOLTAGE FACTORY
LINE VOLTAGE FIELD
LOW VOLTAGE FACTORY
LOW VOLTAGE FIELD
ALT/OPTIONAL WIRING
COLOR CODE
BK BLACK O ORANGE
BL BLUE R RED
BR BROWN Y YELLOW
G GREEN WHT WHITE
PK PINK T TAN

SMB05ACP Recommended Spare Parts	Marvair Part Number
Compressor	10343
Control Module	01627
Evaporator Coil	60127
Motorized Impeller (Blower)	40116
Control Board	50196
Condenser (water coil)	60194
High Pressure Switch	70339
Cap Tube/Strainer Assembly	20419
Filter	91916
Low Voltage Harness Assembly	01678
VDC Power Harness Assembly	01679

SMD14 Recommended Spare Parts	Marvair Part Number
Compressor 24 to 48VDC	10377
Controller, Digital	70593
Coil Indoor, Black	60181
Motorized Impeller 24V (Blower)	40157
Board, Control 12/24 VDC Interface	92211
Heat Exchanger, Coaxial, Black	60193
High Pressure Switch R134A, 250 Open/150 Close	70339
Capillary Tube Assembly	S/09088
Filter 13¼” x 11-5/8” x 1/4” PERMACOOL	92150
Harness, Low Voltage DC 4 PIN	01928
Harness Low Voltage DC 8 PIN	01930
VDC Power Harness	01679

Chapter 11 – Warranty

Marvair® Marine Self-Contained and Split Systems Warranty

Parts

If any part of your Marvair unit fails because of a manufacturing defect within twenty-four months from the date of purchase of a new boat or within twenty-four months from the date of installation of the air conditioner, but not to exceed thirty-six from the date of manufacture by Marvair, Marvair will furnish without charge, EXW Cordele, Georgia, the required replacement part.

Labor

If any part of your Marvair reverse cycle air conditioner or air conditioner fails because of a manufacturing defect within twenty-four months from the date of purchase of a new boat or within twenty-four months from the date of installation of the air conditioner, but not to exceed thirty-six from the date of manufacture by Marvair, Marvair will pay for the related service labor to replace the failed part according to the Marvair Flat Rate Schedule currently in effect. The owner must provide proof of the date of the purchase of the boat or date of installation of the Marvair unit. The owner's registration card filed with Marvair, the invoice for the purchase of the vessel, an invoice for the installation of the unit, or similar documents are examples of proof of the date.

When service is required, it must be performed during normal working hours (8:00 a.m. to 5:00 p.m.) Monday through Friday and must be performed by Marvair personnel or their designated Service Representative.

The responsibility of the Owner of the Equipment includes the following:

1. To operate the equipment according to the manufacturer's instructions.
2. To provide easy accessibility for service.
3. To check and reset circuit breaker(s) and disconnect before calling for service. (Circuit breaker(s) may be in the main service panel.)
4. To keep the unit clean and free of dirt.
5. To clean and/or replace the filter as required. (The filter may be located in the return air filter grille or in front of the evaporator coil.)
6. To keep the evaporator coil clean and the condenser coil free of sediment or scale.
7. To pay the charges incurred when any of the above have not been done.
8. To pay for repair or replacement of any material or part other than those within the Marvair unit or thermostat itself.
9. To check any fuses on the circuit board and replace as required.

The owner of the product may ship the allegedly defective or malfunctioning product or part to Marvair, at such owner's expense, and Marvair will diagnose the defect and, if the defect is covered under this warranty, Marvair will honor its warranty and furnish the required replacement part. All costs for shipment and risk of loss during shipment of the product or part to Marvair and back to the owner shall be the responsibility and liability of the owner. Upon request by an owner, Marvair may arrange for remote diagnosis and repair of the allegedly defective or malfunctioning product or part.

An owner requesting performance under this Warranty shall provide reasonable access to the allegedly defective or malfunctioning product to Marvair and its authorized agents and employees.

This warranty does not cover damage caused by improper installation including any refrigerant leaks in the tubing and fittings between the evaporator and condenser sections on split systems; misuse of equipment; negligent servicing; damage due to use of the product for purposes other than those for which it was designed; damage caused by natural disasters, power surges, lightning and submersion; damage caused by unauthorized modifications; and damage caused by improper wiring or power supply to the air conditioner including operating the unit with an undersized generator.

THIS WARRANTY AND SERVICE POLICY CONSTITUTE THE EXCLUSIVE REMEDY OF ANY PURCHASER OF A MARVAIR REVERSE CYCLE AIR CONDITIONER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE, TO THE FULLEST EXTENT PERMITTED BY LAW. IN NO EVENT SHALL ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE EXCEED THE TERMS OF THE APPLICABLE WARRANTY STATED ABOVE AND MARVAIR SHALL HAVE NO OTHER OBLIGATION OR LIABILITY. IN NO EVENT SHALL MARVAIR BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR MONETARY DAMAGES.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE-TO-STATE. Some states do not allow limitations or exclusions, so the above limitations and exclusions may not apply to you.

5/09 Rev. 5

Notes